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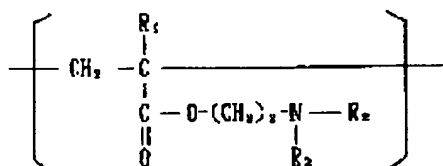
(54) DEHYDRATION-ACCELERATING AGENT FOR PULP SLURRY

(57)Abstract:

PURPOSE: To obtain a dehydration-accelerating agent not causing the failure in the sheet formation of pulp and the foaming phenomenon of the sheet by specifying diallyldimethylammonium chloride and a cationic polymer as the components.

CONSTITUTION: This agent contains (A) diallyldimethylammonium chloride having a mol.wt. of 500000-1000000 and (B) a cationic polymer containing units of the formula (R1 is H, methyl; R2 is lower alkyl) or their quaternary salt as main constituting units and having a mol.wt. of 2000000-20000000. The agent contains the components A and B in a weight ratio of 20:1 to 1:1, preferably 5:1 to 1:1.

The agent exhibits an excellent dehydration-accelerating effect by the addition of a small amount of the components.



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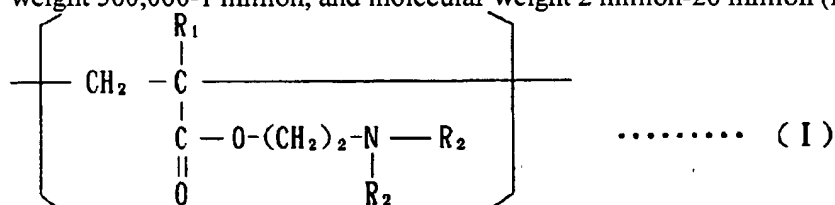
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CLAIMS

[Claim(s)]

[Claim 1] The general formula of the diaryl dimethylanmonium chloride polymer of molecular weight 500,000-1 million, and molecular weight 2 million-20 million (I): [Formula 1]



(-- as for R1, a hydrogen atom or a methyl group, and R2 show a low-grade alkyl group among a formula.) -- dehydration accelerator of the unit expressed or the pulp slurry characterized by containing the cation system polymer which makes the fourth class salt of the main configuration unit as an active principle.

[Claim 2] The dehydration accelerator according to claim 1 whose blending ratio of coal of a diaryl dimethylanmonium chloride polymer and a cation system polymer is 20:1-1:1.

[Claim 3] The dehydration accelerator according to claim 1 or 2 whose cation system polymer is a copolymer of the fourth class salt of the homopolymer of dimethylamino ethyl acrylate or dimethylaminoethyl methacrylate, the homopolymer of the fourth class salt of a ** (meta) chestnut rate, a ** (meta) chestnut rate, or a ** (meta) chestnut rate, and a krill (meta) amide.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the dehydration accelerator of a pulp slurry. It is related with the dehydration accelerator which falls the water content of the water pulp wet sheet generated after vacuum dehydration of a washing filter, a thickener or a machine wire, etc., etc. by adding to the production process of a pulp wet sheet in more detail.

[0002]

[Description of the Prior Art] The former and pulp are **** and ***** as wet pulp which is supplied from a digestion process and has the water content around 50% with a pulp machine through a washing process and a bleaching process. Or beating of the pulp raw material which passed through the bleaching process is carried out, and paper making is carried out. If the water content of wet pulp is reduced, the rise of a machine rate, prevention of a sheet piece, and reduction of the amount of the steam used which it has in a dryer will take place, and it will lead to improvement in pulp productivity. Moreover, in the washing filter and thickener in a washing process and a bleaching process, improvement in pulp detergency and reduction of the amount of the chemical used further used for bleaching are brought about by the dehydration disposition top. If detergency is bad, the pitch matter will be carried into a back process and will induce a pitch trouble.

[0003] Moreover, also when reducing the water content of paper, the effectiveness seen at the time of the water content fall of wet pulp and the same effectiveness are seen. In the paper-making process, cationic macromolecules, such as polyethyleneimine and polyacrylamide, are conventionally used for this purpose. On the other hand, when the usual addition of the dehydration effectiveness is inadequate if cationic macromolecules, such as polyethyleneimine and polyacrylamide, are used to pulp processes, such as a pulp machine and a washing filter, and a thickener, and the addition was increased, pulp sheet formation became uneven and there was a problem of not being desirable.

[0004] Although an operation of these cationic giant molecule makes a fiber front face condense a microfilament or is considered for hydraulic surface area to decrease by adsorption of a up to [the fiber front face of the fibril by neutralization of a charge] etc., it is considered to be a reason for not demonstrating effective effectiveness that only non-beating or slight beating is made and the pulp fiber of a pulp process does not have an operand called a microfilament and fibril.

[0005] Independently, the above cationic high polymer coagulants (an example, the poly amino alkyl (meta) chestnut rate, polyethyleneimine, chitosan, the poly dimethyl diaryl ammonium salt, etc.) are used for dehydration of the sludge from a domestic waste or industrial waste water (a fresh-water-generation technique, 8 (3), 37-43 (1982)). use of a non-ion system surfactant is proposed as a dehydrating agent which does not affect pulp sheet formation comparatively -- **** (refer to JP,1-306693,A) -- for improvement in sufficient dehydration nature, many amount used is needed and the problem of a foaming phenomenon arises in connection with closed ** of Hokusui. Moreover, the dehydration approach of paper of adding the cationic polymer of low molecular weight like a diaryl dimethylanmonium chloride polymer to dehydration of the paper of a paper machine, and then adding the acrylamide copolymer of colloidal silica and the amount of macromolecules to it is proposed (refer to JP,1-162897,A).

[0006]

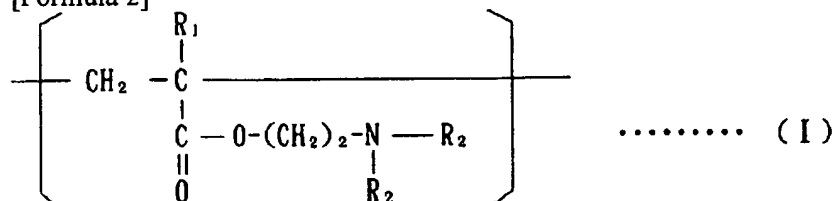
[Problem(s) to be Solved by the Invention] However, when the aforementioned approach was applied to a pulp chemically-modified [which consists of a washing filter, a thickener, and a pulp machine] degree, there was a trouble not only the dehydration effectiveness is inadequate, but that sheet formation became an ununiformity. The effective dehydration accelerator of under this situation and a pulp chemically-modified degree is called for.

[0007] This artificer found out the dehydration accelerator with the water content fall function excellent in little addition irrespective of beating and unbeaten pulp. Furthermore, the dehydration accelerator of this invention checks not causing poor sheet formation and the foaming phenomenon of pulp, and came to complete this invention.

[0008]

[Means for Solving the Problem] according to this invention in this way -- general formula [of the diaryl dimethylanmonium chloride polymer of molecular weight 500,000-1 million, and molecular weight 2 million-20 million] (I): [0009]

[Formula 2]



[0010] (-- as for R1, a hydrogen atom or a methyl group, and R2 show a low-grade alkyl group among a formula.) -- the dehydration accelerator of the unit expressed or the pulp slurry characterized by containing the cation system polymer which makes the fourth class salt of the main configuration unit as an active principle is offered. Although the diaryl dimethylanmonium chloride polymer of the molecular weight 500,000-1 million which is the active principles of this invention, or the specific cation system polymer of molecular weight 2 million-20 million is typical as a polymer coagulant, when respectively independent addition is carried out, in the pulp production process of non-beating, an effective dehydration facilitatory effect is not acquired for an above-mentioned reason.

[0011] When this invention uses together the diaryl dimethylanmonium chloride polymer of the above-mentioned molecular weight 500,000-1 million, and the specific cation system polymer of molecular weight 5 million-20 million, it is based on discovery of the fact that the extremely excellent multiplication dehydration facilitatory effect is acquired. Although the detail of the operation is not clear, it is considered that both operations of the water-break promotion by condensation of a microfilament and the fall of surface tension are demonstrated in multiplication.

[0012] The molecular weight of the diaryl dimethylanmonium chloride polymer which is the active principle of this invention is 500,000-1 million, and it is 600,000-900,000 preferably, and the molecular weight of a specific cation system polymer is 2 million-20 million, and is 5 million-12 million preferably. the molecular weight of the diaryl dimethylanmonium chloride polymer of this invention, and a specific cation system polymer -- the above -- since a multiplication dehydration facilitatory effect is not acquired as it is out of range, it is not desirable.

[0013] It sets to the above-mentioned general formula (I) showing the cation system polymer of this invention, and is R2. As a low-grade alkyl group expressed, the alkyl group of the shape of the shape of a straight chain of carbon numbers 1-4 and branching is desirable. As an example of this cation system polymer, the copolymer of the homopolymer of a dimethylaminoethyl (meta) chestnut rate, a diethylaminoethyl (meta) chestnut rate, a dipropyl aminoethyl (meta) chestnut rate, and a dibutyl aminoethyl (meta) chestnut rate, the homopolymer of the fourth class salt of this acrylate, this acrylate, or the fourth class salt of this acrylate and a krill (meta) amide is raised.

[0014] It is desirable to use the copolymer of the fourth class salt of the homopolymer of a dimethylaminoethyl (meta) chestnut rate, the homopolymer of the fourth class salt of a ** (meta) chestnut rate, a ** (meta) chestnut rate, or a ** (meta) chestnut rate and a krill (meta) amide among these cation system polymers in respect of the improvement in a dehydration facilitatory effect. As a

ratio (weight ratio) by which the synergistic effect is demonstrated in the combination of the diaryl dimethylammonium chloride polymer and cation system polymer which are an active principle in this invention, being referred to as 20:1-1:1 is suitable, and being referred to as 5:1-1:1 is more desirable.

[0015] As for each active principle of this invention, it is desirable to 1-liquid-pharmaceutical-preparation-ize and to usually use with the gestalt of liquids and solutions. However, depending on the candidate for use, you may use with gestalten, such as powder material, without being limited to this. When considering as 1 liquid pharmaceutical preparation, it is desirable to dilute and pharmaceutical-preparation-ize them in water, since both compounds are water solubility.

[0016] Moreover, it is desirable, in order that you may consider as emulsion pharmaceutical preparation using dispersants, such as water, hydrocarbon system solvents, such as kerosene and spindle oil, and the Nonion system surface active agent, depending on the case and using 1 - 20 weight section, the hydrocarbon system solvent 10 - 20 weight sections, and the Nonion system surface active agent 1 - 5 weight sections remainder as water may consider an active principle as stable emulsion pharmaceutical preparation in that case.

[0017] Although the addition of said active principle changes with the class of pulp, slurry properties (concentration, pH, etc.), properties of a filter, etc., it is 0.01 - 1 % of the weight (bone-dry object) of opposite pulp, and is 0.01 - 0.2 % of the weight of opposite pulp more preferably. The effectiveness of negating an economical demerit at 0.001 or less % of the weight of opposite pulp even if a desirable dehydration facilitatory effect is not acquired but it adds 5 % of the weight or more of opposite pulp does not have an addition.

[0018] What is necessary is for the addition locations of the dehydration accelerator of this invention to be the head box of for example, a washing filter, a machine chest, a mixing chest, etc., and just to add them before dehydration down stream processing. This invention is illustrated according to the following examples of a trial and examples.

[0019]

[Example]

The dehydration effectiveness was examined using 2% slurry (35 degrees C of solution temperature) containing extracted LBKP (broad-leaved tree bleached kraft pulp) about the dehydration accelerator of this invention, and the drugs as an example of a comparison from an example of trial 1 certain Kraft works pulp machine, and the staff box.

[0020] BUFUNA which stretched the plastics wire of 100 meshes by which what specifically added the water solution of various drugs so that it might become this slurry and this slurry with predetermined concentration was connected to the reduced pressure dehydrator -- it put into the funnel and suction filtration was carried out for 1 minute by 50cmHg whenever [reduced pressure]. Then, after removing the pulp sheet and measuring the weight of a pulp sheet, observing the desquamative state of the sheet, and the foaming condition of filtered water (W1g), in the 105-degree C oven, after 4.5-hour desiccation, it cooled radiationally and weight was measured (W2g). It asked for the water content of water pulp by the degree type.

[0021]

water content (%) = $(W1 - W2) / W1 \times 100$ of water pulp -- the result is shown in Table 1. In addition, an addition shows weight % to opposite pulp (bone-dry object) among Table 1, and the alphabet of a sample offering compound shows the following compounds.

- A: Diaryl dimethylammonium chloride polymer (molecular weight 700,000 [about])
- B: Dimethylaminoethyl methacrylate polymer (molecular weight 7 million [about])
- C: Diaryl dimethylammonium chloride polymer (molecular weight 100,000 [about])
- D: Diaryl dimethylammonium chloride polymer (molecular weight 2 million [about])
- E: Dimethylaminoethyl methacrylate polymer (molecular weight 1 million [about])
- F: Polyoxyethylene lauryl ether (EO three-mol addition product)

[0022]

[Table 1]

	試験 番号	供試 薬剤名	配合比率 A : B	添加量	含水率 (%)	観 察 結 果
実 施 例	1	A + B	2 : 1	0.01	77.0	剥離性良好 発泡無
	2	~	2 : 1	0.02	76.3	同 上
	3	~	1 : 1	0.01	77.7	同 上
	4	~	1 : 1	0.02	77.5	同 上
	5	~	4 : 1	0.01	77.8	同 上
	6	~	4 : 1	0.02	77.3	同 上
比 較 例	7	-	-	-	79.3	同 上
	8	C + B	2 : 1	0.01	79.1	同 上
	9	C + B	2 : 1	0.02	79.2	同 上
	10	D + B	2 : 1	0.01	79.3	同 上
	11	D + B	2 : 1	0.02	79.4	同 上
	12	A + E	1 : 1	0.01	79.1	同 上
	13	A + E	1 : 1	0.02	79.0	同 上
	14	A	-	0.01	79.2	発泡有り
	15	A	-	0.02	79.0	発泡有り
	16	B	-	0.01	79.1	剥離性不良
	17	B	-	0.02	79.3	剥離性不良
	18	F	-	0.01	78.9	発泡有り
	19	F	-	0.02	78.6	発泡有り

[0023] [Consideration of the example 1 of a trial] In the test numbers 1-6 which are the examples of this invention, it turns out that the water content of a pulp sheet is falling 1.5 to 3.0% as compared with the time of drugs additive-free [of a test number 7] so that more clearly than a test result. In a site, when the water content of a pulp sheet falls 1%, for example, and the press load in press PERT is pressed down and it dries with a dryer after that, the economical merit that the amount of dry steam is reducible 4 to 5% is obtained.

[0024] Even if this invention has the molecular weight of a diaryl dimethylanmonium chloride polymer and a specific cation system polymer out of range or it is within the limits of this invention as compared with it, when the non-ion system surfactant which are the case where it is used independently, respectively, and a well-known dehydrating agent is used, as test numbers 8-19 are shown, the dehydration effectiveness is inadequate, or the detachability of foaming or a pulp sheet becomes poor and it turns out that it is not practical.

[0025] The dehydration effectiveness was examined like the example 1 of a trial about the dehydration accelerator of this invention, and the drugs as an example of a comparison from the before [example of trial 2 certain Kraft works DDRO] thickener head box, using 2.2% slurry containing extracted LUKP (broad-leaved tree non-bleached kraft pulp) as sample offering water. However, solution temperature was examined at 25 degrees C. The result is shown in Table 2. In addition, the alphabet of the column of an addition and a sample offering drugs name is the same as that of the example 1 of a trial among Table 2.

[0026]

[Table 2]

	試験 番号	供試 薬剤名	配合比率 A : B	添加量	含水率 (%)	観 察 結 果
実 施 例	1	A + B	2 : 1	0.01	77.4	剝離性良好 発泡無
	2	"	2 : 1	0.02	75.7	同 上
	3	"	1 : 1	0.01	77.9	同 上
	4	"	1 : 1	0.02	76.3	同 上
比 較 例	5	—	—	—	78.9	同 上
	6	A	—	0.01	78.5	発泡有り
	7	A	—	0.02	78.3	発泡有り
	8	B	—	0.01	78.6	剝離性不良
	9	B	—	0.02	78.0	剝離性不良
	10	F	—	0.01	78.3	発泡有り
	11	F	—	0.02	77.9	発泡有り

[0027] The dehydration effectiveness was examined like the example 1 of a trial about the dehydration accelerator of this invention, and the drugs as an example of a comparison, using an example of trial 3 certain report-grade-paper inlet pulp slurry (1.1%) as sample offering water. Moreover, the suspended solid (SS) of filtrate and (%) were measured according to JIS KO 102-14. However, solution temperature examined whenever [35 degrees-C and reduced pressure] as 10cmHg(s). The result is shown in Table 3. In addition, the alphabet of the column of an addition and a sample offering drugs name is the same as that of the example 1 of a trial among Table 3.

[0028]

[Table 3]

	試験 番号	供試 薬剤名	配合比率 A : B	添加量	含水率 (%)	濾液のSS (%)	観 察 結 果
実 施 例	1	A + B	2 : 1	0.01	78.8	0.055	剥離性良好 発泡無
	2	"	2 : 1	0.02	77.1	0.048	同 上
	3	"	4 : 1	0.01	80.2	0.063	同 上
	4	"	4 : 1	0.02	78.5	0.059	同 上
比 較 例	5	—	—	—	82.1	0.079	同 上
	6	A	—	0.01	82.5	0.074	発泡有り
	7	A	—	0.02	81.7	0.081	発泡有り
	8	B	—	0.01	81.3	0.059	剥離性不良
	9	B	—	0.02	81.0	0.054	剥離性不良
	10	F	—	0.01	82.0	0.080	発泡有り
	11	F	—	0.02	82.1	0.083	発泡有り

[0029] In an example 1 certain Kraft works KAMIRU machine, by making into an active principle the following sample offering drugs which are dehydration accelerators of this invention, 0.02 % of the weight (bone-dry object) of opposite pulp, it added 0.04% of the weight, and the dehydration effectiveness was examined in the LBKP staff box. The result is combined with the test result in dehydration accelerator additive-free, and is shown in Table 4.

[0030]

[Table 4]

試験 番号	供試 薬剤名	配合比率 A : B	添加量	ワイヤー 後の含水 率 (%)	最終シート の湿潤重量 (g/1枚)	最終シー トの含水 率 (%)	観察結果
1	A + B	2 : 1	0.02	60.2	1750	49.1	剥離性良好
2	"	2 : 1	0.04	58.5	1850	48.1	剥離性良好
3	—	—	—	63.3	1700	50.2	

[0031] [Consideration of an example 1] In the test numbers 1 and 2 which are the examples of this invention, decline in the water content of the pulp sheet after a wire was seen in about 30 - 45 minutes after addition initiation, and the loads in a press roll decreased in number. Machine speed was gathered for the thickness of a sheet with the constant-speed conditions for 24m/, and it was operated, and there is also no sheet piece for about 12 hours, and it has operated. In the test number 3 which is an example of a comparison, when thickness was raised at the same machine speed, a sheet piece was not able to start and thickness was not able to be raised. Moreover, while the weight increased the last sheet as compared with the time of drugs additive-free, water content decreased.

[0032] When the humid weight of the last sheet and the weight of the water content to bone-dry pulp were computed, it was set to 890.75g, 960.15g, and 846.6g at the order of a test number, respectively, and the rise of 13.4% of productivity was acquired with 5.2% of test number 2 with the

test number 1.

[0033]

[Effect of the Invention] The dehydration accelerator of the pulp slurry of this invention produces the effectiveness that the dehydration facilitatory effect excellent in little addition is demonstrated, irrespective of beating and unbeaten pulp. In the pulp process which contains unbeaten pulp especially, the practical effectiveness that the outstanding dehydration facilitatory effect is demonstrated is produced, without producing the defect of the dehydration effectiveness, the poor formation and poor detachability of a pulp sheet, and the foaming problem which had turned into a problem in use of the conventional dehydration accelerator.

[0034] The dehydration accelerator of the pulp slurry of this invention is used, and the dehydrated pulp sheet produces the merit which the weight increase of the last sheet is promoted and leads to energy saving and the rise of productivity while the press loads in press PERT decrease in number.

[Translation done.]